CLAIMS

What is claimed is:

1.   ~~A sequence processor for providing access to a sequence of~~ audio segments accessible by an audio server, the sequence processor comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a)   receiving a request for playing a sequence of stored audio data segments, the sequence being identified by an audio identifier;

(b)   locating, in an audio server database, a provisioned sequence of audio segments based on the audio identifier; and

(c)   playing the sequence of audio segments.

2.   The sequence processor of claim 1 wherein receiving a request includes receiving a request from a media gateway control protocol (MGCP) call agent.

3.   The sequence processor of claim 2 wherein receiving a request includes receiving an MGCP NotifyRequest command from the call agent.

4.   The sequence processor of claim 1 wherein playing the sequence includes transmitting the audio data packets to a gateway over a packet-based network, wherein the gateway plays the sequence.

5.   The sequence processor of claim 1 wherein receiving a request includes receiving a request for playing a sequence of audio data segments and at least one of the segments is a variable.

6. The sequence processor of claim 5 wherein playing the sequence of audio segments includes resolving the variable into an audio data segment.

7. A set processor for providing access to elements of a set of stored audio data, the set processor comprising computer-executable instructions embodied in a computer-readable medium for performing steps, comprising:

(a) receiving a request to play an audio segment, the request including an audio identifier for identifying a set containing the audio segment and a selector for specifying a member of the set corresponding to the audio segment; and

(b) selecting the audio segment to be played based on the audio identifier and the selector.

8. The set processor of claim 7 wherein the set contains a plurality of levels of audio data qualifiers and the selector specifies a path through the levels that leads to the member corresponding to the audio segment to be played.

9. The set processor of claim 7 wherein the set contains a plurality of levels of audio data qualifiers and the selector specifies a partial path through the levels and selecting the audio data segment to be played includes traversing the levels in the order specified by the selector and supplying default paths through levels not specified by the selector.

10.   The set processor of claim 7 wherein receiving a request to play an audio data segment includes receiving a request from a media gateway control protocol (MGCP) call agent.

11.   The set processor of claim 10 wherein receiving a request to play an audio data segment includes receiving an MGCP NotifyRequest command from the MGCP call agent.

12.   A variable processor for providing access to stored audio data segments corresponding to variables, the variable processor comprising computer-executable instructions embodied in a computer-readable medium for performing steps, comprising:

(a)   receiving a request to play audio data, the request including a variable; and

(b)   determining whether the variable is an embedded variable;

(c)   in response to determining that the variable is an embedded variable, resolving a sequence of audio data segments containing the variable and resolving the variable; and

(d)   playing the sequence including the variable.

13.   The variable processor of claim 12 comprising, in response to determining that the variable is not an embedded variable, resolving the variable into at least one audio data segment based on at least one of type, subtype, and value of the variable.

14.   The variable processor of claim 13 wherein the variable is a multilanguage variable and wherein resolving the variable includes selecting

audio data segments to be played based on a language specified by the variable.

15. The variable processor of claim 12 wherein the variable is a multilanguage variable and wherein resolving the variable includes selecting audio data segments to be played based on a language specified by the variable.

16. The variable processor of claim 12 wherein receiving a request to play audio data includes receiving a request including a variable and a selector and resolving the variable includes identifying a set containing an audio data segment to be played.

17. The variable processor of claim 16 comprising identifying the audio data segment to be played based on the selector.

18. The variable processor of claim 13 wherein receiving a request to play audio data includes receiving a request including a variable and a selector, wherein resolving the variable includes identifying a set containing an audio data segment to be played.

19. The variable processor of claim 18 comprising identifying the audio data segment to be played based on the selector.

20. An audio server comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a)   receiving a request to collect digits or speech entered by a user in a telecommunications network, the request including an initial prompt parameter for specifying an initial audio prompt to be

played to a user and at least one reprompt parameter for specifying a reprompt to be played to a user;

(b)   playing the initial prompt to a user;

(c)   monitoring digits or speech from a user; and

(d)   in response to failing to receive speech or digits from a user, playing the reprompt to the user.

21.   The audio server of claim 20 wherein receiving a request for collecting digits or speech entered by a user includes receiving a request from a media gateway control protocol MGCP call agent.

22.   The audio server of claim 21 wherein receiving a request from the MGCP call agent includes receiving a play collect event in a NotifyRequest command the MGCP call agent.

23.   The audio server of claim 20 wherein receiving a request includes receiving a request including an initial parameter for specifying an initial prompt to be played to a user, a reprompt parameter for specifying a reprompt to be played to a user, and a no digits reprompt for specifying a no digits reprompt to be played to a user.

24.   The audio server of claim 20 wherein receiving a request includes receiving a play collect event including an initial prompt parameter specifying the initial prompt and a reprompt parameter specifying the re-prompt.

25.   An audio server comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a)   receiving a request for collecting dual-tone multifrequency (DTMF) digits from a user, the request including a regular expression specifying a predetermined pattern of digits to be identified from a user;

(b)   monitoring digits received from a user; and

(c)   comparing digits received from a user to the regular expression.

26.   The audio server of claim 25 comprising, in response to determining that digits received from the user match the regular expression, sending the digits to a media gateway control protocol (MGCP) call agent.

27.   The audio server of claim 25, comprising, in response to determining that digits received from the user do not match the regular expression, notifying a media gateway control protocol (MGCP) call agent.

28.   An audio server comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a)   receiving a request to monitor digits entered by a user, the request containing a first parameter specifying an expected number of digits, a second parameter specifying a terminating digit, and a third parameter specifying a last digit timer value;

(b)   monitoring digits received from a user;

(c)   determining whether the expected number of digits have been received from a user based on the first parameter;

(d)   in response to determining that the expected number of digits have been received, starting a timer;

(e) determining whether the terminating digit has been received from a user;

(f) in response to determining that the terminating digit has been received, reading the timer and determining whether a first relationship exists between the timer and last digit timer value; and

(g) in response to determining the first relationship exists, identifying the terminating digit received from a user as a terminating digit.

29. The audio server of claim 28 comprising, in response to determining that the first relationship does not exist, identifying the terminating digit received from a user as part of a new key sequence.

30. The audio server of claim 29 wherein receiving a request to monitor digits entered by a user comprises receiving a NotifyRequest command from a media gateway control protocol (MGCP) call agent.

31. The audio server of claim 30 wherein the NotifyRequest command includes a play collect event for requesting the collection of digits from the user.

32. The audio server of claim 31 wherein the play collect event includes the third parameter for specifying the last digit timer value.

33. An audio server comprising computer-executable instructions embodied in a computer-readable medium for performing steps, comprising:

(a) receiving a request to play stored audio data to a user, the request including at least one function key or navigation key

parameter for allowing a user to control collection of digits, recording of audio or playing of audio;

(b) playing audio to a user;

(c) monitoring digits from a user to determine whether a function key or a navigation key has been received; and

(d) in response to determining that a function or navigation key has been received, controlling the collection of digits, recording of audio, or playing of the audio to a user, in accordance with the function or navigation key.

34. The audio server of claim 33 wherein the request includes a position key parameter identifying a position key for allowing a user to specify a predetermined segment in a sequence of audio being played to a user, wherein the audio server plays the specified segment in response to receiving the position key from a user.

35. The audio server of claim 33 wherein the request includes a restart key parameter identifying a restart key for allowing a user to restart entry of digits or speech, wherein when the audio server receives the restart key from a user, the audio server discards any audio or digits received from a user prior to receipt of the restart key.

36. A sequence processor for providing access to a sequence of audio segments accessible by an audio server, the sequence processor comprising:

(a)   means for receiving a request for playing a sequence of stored audio data segments, the sequence being identified by an audio identifier;

(b)   means for locating, in an audio server database, a provisioned sequence of audio segments based on the audio identifier; and

(c)   means for playing the sequence of audio segments.

37.   The sequence processor of claim 36 wherein the means for receiving a request comprises means for receiving a request from a media gateway control protocol (MGCP) call agent.

38.   The sequence processor of claim 36 wherein the means for playing the sequence includes means for transmitting the audio data packets to a gateway over a packet-based network, wherein the gateway plays the sequence.

39.   The sequence processor of claim 36 wherein the means for receiving a request includes means for receiving a sequence including at least one variable and wherein the means for playing the sequence of audio segments includes means for resolving the variable into an audio data segment.

40.   A set processor for providing access to elements of a set of stored audio data, the set processor comprising:

(a)   means for receiving a request to play an audio segment, the request including an audio identifier for identifying a set containing the audio segment and a selector for specifying a member of the set corresponding to the audio segment; and

(b)   means for selecting the audio segment to be played based on the audio identifier and the selector.

41.   The set processor of claim 40 wherein the set contains a plurality of levels of audio data qualifiers and the selector specifies a path through the levels that leads to the member corresponding to the audio segment to be played, wherein the means for selecting the audio segment to be played to the user includes means for traversing the set based on the path specified by the selector .

42.   The set processor of claim 41 wherein the set contains a plurality of levels of audio data qualifiers and the selector specifies a partial path through the levels and the means for selecting the audio data segment to be played includes means for traversing the levels in the order specified by the selector and supplying default paths through levels not specified by the selector.

43.   A variable processor for providing access to stored audio data segments corresponding to variables, the variable processor comprising:

(a)   means for receiving a request to play audio data, the request including a multilanguage variable specifying a language in which the audio data is to be played; and

(b)   means for resolving the multilanguage variable into at least one audio data segment based on the language specified in the request; and

(c)   means for playing the audio data segment.

44.   The variable processor of claim 43 wherein the means for resolving the multilanguage variable includes means for selecting audio data segments having inflections in accordance with the language specified in the request.

5   45.   The variable processor of claim 43 comprising means for qualifying the multilanguage variable after resolving the multilanguage variable using a selector.

46.   An audio server comprising:

(a)   means for receiving a request for collecting dual-tone

10   multifrequency (DTMF) digits from a user, the request including

a regular expression specifying a predetermined pattern of digits

to be identified from a user;

(b)   means for monitoring digits received from a user; and

(c)   means for comparing digits received from a user to the regular

15   expression.

47.   The audio server of claim 46 comprising means, responsive to determining that digits received from a user match the regular expression, for sending the digits to a media gateway control protocol (MGCP) call agent.

48.   The audio server of claim 46, comprising, means, responsive to

20   determining that digits received from a user do not match the regular expression, for notifying a media gateway control protocol (MGCP) call agent.

49.   An audio server comprising:

(a)   means for receiving a request to play stored audio data to a

user, the request including at least one function key or

navigation key parameter for allowing a user to control collection of digits, audio, or playing of audio;

(b)   means for playing audio to a user;

(c)   means for monitoring digits from a user to determine whether a

5   function key or a navigation key has been received; and

(d)   means, responsive to determining that a function or navigation key has been received, for controlling the collection of digits, audio, or the playing of audio, in accordance with the function or navigation key.

10   50.   The audio server of claim 49 wherein the request includes a position key parameter identifying a position key for allowing a user to specify a predetermined segment in a sequence of audio being played to a user, and the audio server includes means for playing the specified segment in response to receiving the position key from a user.

15   51.   The audio server of claim 48 wherein the request includes a restart key parameter identifying a restart key for allowing a user to restart entry of digits or speech, wherein the audio server includes means, responsive to receiving the restart key from a user, for discarding audio or digits received from the user prior to receipt of the restart key.

20   52.   A method for accessing stored audio data comprising:

(a)   transmitting a request to an audio server for playing stored audio data, the request including an audio identifier identifying a sequence of audio segments to be played;

(b)   locating, in an audio server database, a sequence of provisioned audio segments corresponding to the audio identifier; and

(c)   playing the sequence of audio segments.

53.   The method of claim 52 wherein transmitting a request to an audio server includes transmitting a request from a media gateway control protocol (MGCP) call agent to an audio server.

54.   The method of claim 52 wherein playing the sequence of audio segments to the user includes sending the sequence of audio segments to the user over a packet-based network.

55.   A method for accessing stored audio data comprising:

(a)   transmitting a request to an audio server to play an audio segment, the request including an audio identifier for identifying a set containing the audio segment and a selector for specifying a member of the set corresponding to the audio segment; and

(b)   selecting the audio segment to be played based on the audio identifier and the selector.

56.   The method of claim 55 wherein transmitting a request to an audio server comprises transmitting a request from a media gateway control protocol (MGCP) call agent to the audio server.

57.   The method of claim 55 wherein the set contains a plurality of levels of audio data qualifiers and the selector specifies a path through the levels that leads to the member corresponding to the audio segment to be played.

58.   The method of claim 55 wherein the set contains a plurality of levels of audio data qualifiers and the selector specifies a partial path through the levels and selecting the audio data segment to be played includes traversing the levels in the order specified by the selector and supplying default

5   paths through levels not specified by the selector.

59.   A computer-readable medium having stored thereon a set data structure, the set data structure comprising:

(a)   a first data field containing an audio identifier representing a set containing a plurality of members representing audio data to be

10   played; and

(b)   a second data field containing a selector for selecting one of the members in the set.

60.   An audio server comprising:

(a)   an interface card for receiving a request for playing a sequence

15   of stored audio data segments, the sequence being identified by an audio identifier;

(b)   an audio server database embodied in a memory device storing provisioned sequences of audio data segments; and

(c)   a processor programmed to extract a sequence of audio

20   segments from the audio server database using the audio identifier in the request.

61.   The audio server of claim 60, comprising at least one digital signal processing (DSP) card for converting the sequence of audio data

segments extracted from the audio server database into a format for playing to an end user.

62.   The audio server of claim 60, wherein the audio server database includes sets having members representing audio data segments, and each of the members being selectable by a selector, and wherein the processor is programmed to locate a set in the audio server database based on an audio identifier received in a request and to locate a member in the set based on the selector received in a request.

63.   A processor for providing access to audio data segments accessible by an audio server, the processor comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a)   receiving a request for playing audio data segments, the request including at least one parameter for identifying the audio data segments;

(b)   locating, in an audio server database, the audio data segments based on the parameter; and

(c)   playing the audio segments.

64.   The processor of claim 63, wherein the parameter is an audio identifier for identifying a sequence of audio data segments, and wherein locating the audio data segments includes locating the sequence of audio data segments based on the audio identifier.

65.   The processor of claim 63, wherein receiving a request for playing audio data segments includes receiving a request including an audio

identifier for identifying a set of audio data segments and a selector for selecting members of the set, and wherein locating the audio segments in the audio server database includes locating the segments based on the audio identifier and the selector.

66.   The processor of claim 63, wherein the parameter is a variable, and wherein locating the audio data segments in the audio server database includes resolving the variable into an audio data segment.

67.   An audio server package comprising:

(a)   an event symbol recognizable by an audio server for instructing the audio server to detect or perform an action, the event symbol including a play announcement symbol for instructing the audio server to play an announcement;

(b)   a first parameter associated with the event symbol for defining how the audio server detects or performs the action, the first parameter including an announcement parameter for indicating the announcement to be played; and

(c)   an audio identifier associated with the announcement parameter for uniquely identifying an audio segment including the announcement to be played.

68.   The audio server package of claim 67 comprising a variable parameter associated with the play announcement parameter for instructing the audio server to resolve a variable into an audio identifier and play the announcement specified by the audio identifier.

69. The audio server package of claim 67 comprising a set parameter and a selector parameter associated with the play announcement parameter for instructing the audio server to access a set of stored audio segments and locate the audio segment containing the announcement to be played based on the selector.

5